WE CLAIM:

1. A method of generating laser pulses using a semiconductor laser diode as a lasing amplification medium of an extended laser cavity, the method comprising the steps of:

   a) aligning elements making up the laser cavity for maximum laser output;

   b) providing to the semiconductor laser diode an input current beyond a lasing threshold; and

   c) misaligning at least one of the elements making the laser cavity to achieve passive self-modulated mode-locked operation of the semiconductor laser diode.

2. A method as claimed in claim 1, wherein prior to the step of aligning the elements making up the laser cavity for maximum laser output the method further comprises the step of providing a lasing threshold input current to the semiconductor laser diode.

3. A method as claimed in claim 2, wherein the step of providing the lasing threshold input current, further comprises the step of providing a direct current input current to the semiconductor laser diode.

4. A method as claimed in claim 1, wherein the laser cavity is a ring laser cavity.

5. A method as claimed in claim 1, wherein the semiconductor laser diode further comprises a defect providing a dual-wavelength operation.

6. A method as claimed in claim 5, wherein the semiconductor laser diode has two end facets and the defect is further located closer to one of the end facets.

7. A method as claimed in claim 5, wherein the semiconductor laser diode has two end facets and the defect is further located at one of the end facets.

8. A method as claimed in claim 1, wherein the elements making up the laser cavity are optical elements and the step of aligning the optical elements of the laser cavity for maximum laser output further comprises the step of achieving maximum continuous wave laser output operation of the semiconductor laser diode at the lasing threshold input current.

9. A method as claimed in claim 1, wherein the extended laser cavity includes at least one mirror and the step of misaligning at least one element further comprises misaligning the at least one mirror.

10. A method as claimed in claim 9, wherein the step of misaligning the at least one mirror further comprises the step of misaligning the at least one mirror in a plane of the lasing medium of the semiconductor laser diode.

11. A method as claimed in claim 9, wherein the semiconductor laser diode has an emission output favoring the amplification of at least one center wavelength at the lasing threshold and the step of misaligning the at least one mirror in the plane of the lasing medium further comprises the step of misaligning the mirror to favor amplification of wavelengths shorter than the at least one center wavelength.

12. A method as claimed in claim 1, wherein the extended laser cavity includes at least one lens and the step of misaligning at least one element further comprises misaligning the at least one lens.

13. A method as claimed in claim 12, wherein the step of misaligning the at least one lens further comprises the step of misaligning the at least one lens by shifting the lens along a direction of propagation of a laser signal within the laser cavity.

14. A method as claimed in claim 13, wherein the semiconductor laser diode has an emission output favoring the amplification of at least one center wavelength at the lasing threshold and the step of misaligning the at least one lens further comprises the step of misaligning the lens to introduce color aberration in the laser cavity to favor amplification of wavelengths shorter than the at least one center wavelength.

15. A method as claimed in claim 1, wherein the extended laser cavity includes at least one output coupler and the step of misaligning at least one element further comprises misaligning the at least one output coupler.

16. A method as claimed in claim 15, wherein the step of misaligning the at least one coupler further comprises the step of misaligning the at least one output coupler in a plane of the lasing medium of the semiconductor laser diode.

17. A method as claimed in claim 15, wherein the semiconductor laser diode has an emission output favoring the amplification of at least one center wavelength at the lasing threshold and the step of misaligning the at

least one output coupler in the plane of the lasing medium further comprises the step of misaligning the output coupler to favor amplification of wavelengths shorter than the at least one center wavelength.

18. A method as claimed in claim 1, wherein the extended laser cavity includes at least one prism and the step of misaligning at least one element further comprises misaligning the at least one prism.

19. A method as claimed in claim 18, wherein the step of misaligning the at least one prism further comprises the step of misaligning the at least one prism in the plane of the lasing medium of the semiconductor laser diode.

20. A method as claimed in claim 18, wherein the semiconductor laser diode has an emission output favoring the amplification of at least one center wavelength at the lasing threshold and the step of misaligning the at least one prism in the plane of the lasing medium further comprises the step of misaligning the at least on prism to favor amplification of wavelengths shorter than the at least one center wavelength.